

Gliders collect data in Southern Ocean

Unmanned ocean gliders are collecting data 1,000m below the surface of the Southern Ocean and sending it back to climate scientists and oceanographers.



"This is the first time measurements of the Southern Ocean are being made on this scale," says Pedro Monteiro, head of the Southern Ocean Carbon-Climate Observatory (Socco) in Cape Town.

The gliders are fitted with four sensors that collect data about conductivity, temperature and depth, dissolved oxygen, light and chlorophyll.

This information will increase researchers' understanding of the ocean, the natural carbon-dioxide exchange and, ultimately, climate change. The concern is that climate change will disrupt the natural carbon dioxide exchange balance, which will undermine emission reduction efforts, Monteiro says.

While anthropogenic carbon dioxide emissions - those created by humans - are well studied and account for about 10 gigatons, the natural carbon cycle is substantially larger at 100 gigatons and is less understood, he says.

This lack of data is especially true for the Southern Ocean, which is also where cold, northward-flowing waters from the Antarctic mix with warmer sub-Antarctic waters.

Lungs of the world

Isabelle Ansorge, part of the University of Cape Town's Marine Research Institute, has previously told *Business Day* that research in the Southern Ocean is critical.

"It is the only ocean that is not surrounded by land, but by other oceans. It is almost like the lungs of the world's water systems," she says.

The Council for Scientific and Industrial Research (CSIR) says: "Recent estimates indicate that 50% of all carbon dioxide emitted by human activity is stored in the Southern Ocean."

SA has a long tradition of involvement in the Southern Ocean, but this was mainly focused on natural resource assessments and studies, says Monteiro, who is also the principal oceanographer at the CSIR.

"Our involvement in carbon and climate research is relatively recent," he adds.

The observatory, launched in 2008, is a CSIR-led multi-institutional initiative.

"There is an international effort in the Southern Ocean, and we, as a South African programme, are making a strong contribution to this," says Monteiro.

The Department of Science and Technology has highlighted global climate change as one of its five challenges and a focus area for its attention and funding.

Other challenges include the bio-economy, space, energy and human and social dynamics. One of the tools that the Socco team is using to investigate the Southern Ocean is ocean gliders, autonomous unmanned robots that collect data from the rough and remote areas continuously.

Gliders

"Gliders are the future," says post-doctoral researcher Sebastiaan Swart. "We can collect data for long periods without having to be there."

Other tools include equipment on SA's polar research vessel, the SA Agulhas II.

In October, two gliders were deployed south of Gough Island.

"The two gliders are currently successfully diving from the surface to 1,000m depths and sending us data every couple of hours, while waiting for instructions from us, the glider pilots," Swart says, noting that the glider can be operated remotely from anywhere in the world.

They were bought from US robot manufacturer iRobot for R1.5m each. When asked about the cost, Dr Swart says it makes financial sense.

Previously, data had to be collected from the SA Agulhas, which has now been replaced by the SA Agulhas II, which took "snapshots" on its way down to Antarctica in December and then again on its return, he says.

"The ship costs about R300,000 a day to run in terms of fuel and staff. The gliders cost R1.5m each, but that's just five days of ship time.

"Instead we can use a glider, which will last out there for four to five months before it has to have its battery changed. After that it can be sent out again without the ship being there, and get data about the full seasonal cycle," Swart says.

Although the gliders, funded by the Department of Science and Technology, were bought from the US, Swart notes that there are plans to develop a carbon dioxide sensor.

"Rather than build our own glider, we want to use the existing technology and adapt it in the best way we can," he says.

The data will be available to the public and researchers, both locally and internationally.

Source: *Business Day* via I-Net Bridge

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